

IN THE CLAIMS OF THE REISSUE APPLICATION:

Please cancel claims 7, 9, 17, 20, 34, 37, 53-56, 59-68, 86, 87, 98-101, 132 and 133;
amend claims 2-6, 8, 10-16, 18, 19, 21-33, 35, 36, 38-52, 57, 58, 69-85, 88-97, 102-105, 107 and
113; and add new claims 134-155 as follows:

2. (Amended) [A] The DNA molecule of claim 1 having the sequence of SEQ ID
NO:2.

3. (Amended) [A] The DNA molecule of claim 1 having the sequence of SEQ ID
NO:9.

4. (Amended twice) A recombinant, double-stranded DNA molecule comprising in
sequence:

a) a promoter which functions in plant cells to cause the production of an RNA
sequence;

b) a structural DNA sequence that causes the production of an RNA sequence which
encodes a EPSPS enzyme having the sequence domains:

-R-X₁-H-X₂-E- (SEQ ID NO:37), in which

X₁ is G, S, T, C, Y, N, Q, D or E;

X₂ is S or T; and

-G-D-K-X₃- (SEQ ID NO:38), in which

X₃ is S or T; and

-S-A-Q-X₄-K- (SEQ ID NO:39), in which

X₄ is A, R, N, D, C, Q, E, G, H, I, L, K, M, F, P, S, T, W, Y or V; and

-N-X₅-T-R- (SEQ ID NO:40), in which

X₅ is A, R, N, D, C, Q, E, G, H, I, L, K, M, F, P, S, T, W, Y or V,

provided that when X₁ is D, X₂ is T, X₃ is S, and X₄ is V, then X₅ is [not P] A, R, N, D, C, Q, E, G, H, I, L, K, M, F, S, T, W, Y or V; and

c) a 3' non-translated region which functions in plant cells to cause the addition of a stretch of polyadenyl nucleotides to the 3' end of the RNA sequence;

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the encoded EPSPS enzyme to enhance the glyphosate tolerance of a plant cell transformed with the DNA molecule.

5. (Amended) [A] The DNA molecule of claim 4 in which the structural DNA sequence encodes a fusion polypeptide comprising an amino-terminal chloroplast transit peptide and the EPSPS enzyme.

6. (Amended) [A] The DNA molecule of claim 4 in which X₁ is D or N; X₂ is S or T; X₃ is S or T; X₄ is V, I or L; and X₅ is P or Q, provided that when X₁ is D, X₂ is T, X₃ is S, and X₄ is V, then X₅ is Q.

8. (Amended) [A] The DNA molecule of claim 5 in which X₁ is D or N; X₂ is S or T; X₃ is S or T; X₄ is V, I or L; and X₅ is P or Q, provided that when X₁ is D, X₂ is T, X₃ is S, and X₄ is V, then X₅ is Q.

10. (Amended) [A] The DNA molecule of claim [8] 137 in which the EPSPS [sequence] enzyme [is] has the sequence set forth in SEQ ID NO:3.

11. (Amended) [A] The DNA molecule of claim [10] 4 in which the promoter is a plant DNA virus promoter.

12. (Amended) [A] The DNA molecule of claim 11 in which the promoter is selected from the group consisting of CaMV35S and FMV35S promoters.

13. (Amended) [A] The DNA molecule of claim [10] 5 in which the structural DNA sequence encodes a chloroplast transit peptide selected from the group consisting of SEQ ID NO:11 and SEQ ID NO:15.

14. (Amended) [A] The DNA molecule of claim 13 in which the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

15. (Amended twice) A method of producing genetically transformed plants which are tolerant toward glyphosate herbicide, comprising the steps of:

a) inserting into the genome of a plant cell a recombinant, double-stranded DNA molecule comprising:

i) a promoter which functions in plant cells to cause the production of an RNA sequence,

ii) a structural DNA sequence that causes the production of an RNA sequence which encodes an EPSPS enzyme having the sequence domains:

-R-X₁-H-X₂-E- (SEQ ID NO:37), in which

X₁ is G, S, T, C, Y, N, Q, D or E;

X₂ is S or T; and

-G-D-K-X₃- (SEQ ID NO:38), in which

X₃ is S or T; and

-S-A-Q-X₄-K- (SEQ ID NO:39), in which

X₄ is A, R, N, D, C, Q, E, G, H, I, L, K, M, F, P, S, T, W,

Y or V; and

-N-X₅-T-R- (SEQ ID NO:40), in which

X₅ is A, R, N, D, C, Q, E, G, H, I, L, K, M, F, P, S, T, W,

Y or V,

provided that when X_1 is D, X_2 is T, X_3 is S, and X_4 is V, then X_5 is [not P] A, R, N, D, C, Q, E, G, H, I, L, K, M, F, S, T, W, Y or V; and

iii) a 3' non-translated DNA sequence which functions in plant cells to cause the addition of a stretch of polyadenyl nucleotides to the 3' end of the RNA sequence;

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the polypeptide to enhance the glyphosate tolerance of a plant cell transformed with the DNA molecule;

b) obtaining a transformed plant cell; and

c) regenerating from the transformed plant cell a genetically transformed plant which has increased tolerance to glyphosate herbicide.

16. (Amended) [A] The method of claim 15 in which X_1 is D or N; X_2 is S or T; X_3 is S or T; X_4 is V, I or L; and X_5 is P or Q, provided that when X_1 is D, X_2 is T, X_3 is S, and X_4 is V, then X_5 is Q.

18. (Amended) [A] The method of claim 15 in which the structural DNA sequence encodes a fusion polypeptide comprising an amino-terminal chloroplast transit peptide and the EPSPS enzyme.

19. (Amended) [A] The method of claim 18 in which X₁ is D or N; X₂ is S or T; X₃ is S or T; X₄ is V, I or L; and X₅ is P or Q, provided that when X₁ is D, X₂ is T, X₃ is S, and X₄ is V, then X₅ is Q.

21. (Amended) [A] The method of claim [19] 143 in which the EPSPS enzyme is that set forth in SEQ ID NO:3.

22. (Amended) [A] The method of claim [21] 15 in which the promoter is from a plant DNA virus.

23. (Amended) [A] The method of claim 22 in which the promoter is selected from the group consisting of CaMV35S and FMV35S promoters.

24. (Amended) A glyphosate-tolerant plant cell comprising [a] the DNA molecule of [claims] claim 4, 5[,] or 8 [or 10].

25. (Amended) [A] The glyphosate-tolerant plant cell of claim 24 in which the promoter is a plant DNA virus promoter.

26. (Amended) [A] The glyphosate-tolerant plant cell of claim 25 in which the promoter is selected from the group consisting of CaMV35S and FMV35S promoters.

27. (Amended) [A] The glyphosate-tolerant plant cell of claim 24 selected from the group consisting of corn, wheat, rice, barley, soybean, cotton, sugarbeet, oilseed rape, canola, flax, sunflower, potato, tobacco, tomato, alfalfa, poplar, pine, [eukalyptus] eucalyptus, apple, lettuce, peas, lentils, grape and turf grasses.

28. (Amended) A glyphosate-tolerant plant comprising plant cells of claim 27.

29. (Amended) [A] The glyphosate-tolerant plant of claim 28 in which the promoter is from a DNA plant virus promoter.

30. (Amended) [A] The glyphosate-tolerant plant of claim 29 in which the promoter is selected from the group consisting of CaMV35S and FMV35S promoters.

31. (Amended) [A] The glyphosate-tolerant plant of claim 30 selected from the group consisting of corn, wheat, rice, barley, soybean, cotton, sugarbeet, oilseed rape, canola, flax, sunflower, potato, tobacco, tomato, alfalfa, poplar, pine, [eukalyptus] eucalyptus, apple, lettuce, peas, lentils, grape and turf grasses.

32. (Amended twice) A method for selectively controlling weeds in a field containing a crop having planted crop seeds or plants comprising the steps of:

- a) planting the crop seeds or plants which are glyphosate-tolerant as a result of a

recombinant double-stranded DNA molecule being inserted into the crop seed or plant, the DNA molecule having:

- i) a promoter which functions in plant cells to cause the production of an RNA sequence,
- ii) a structural DNA sequence that causes the production of an RNA sequence which encodes an EPSPS enzyme having the sequence domains:

-R-X₁-H-X₂-E- (SEQ ID NO:37), in which

X₁ is G, S, T, C, Y, N, Q, D or E;

X₂ is S or T; and

-G-D-K-X₃- (SEQ ID NO:38), in which

X₃ is S or T; and

-S-A-Q-X₄-K- (SEQ ID NO:39), in which

X₄ is A, R, N, D, C, Q, E, G, H, I, L, K, M, F, P, S, T, W,

Y or V; and

-N-X₅-T-R- (SEQ ID NO:40), in which

X₅ is A, R, N, D, C, Q, E, G, H, I, L, K, M, F, P, S, T, W,

Y or V,

provided that when X₁ is D, X₂ is T, X₃ is S, and X₄ is V, then X₅ is [not P] A, R,

N, D, C, Q, E, G, H, I, L, K, M, F, S, T, W, Y or V; and

- iii) a 3' non-translated DNA sequence which functions in plant cells to

cause the addition of a stretch of polyadenyl nucleotides to the 3'
end of the RNA sequence,

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the EPSPS enzyme to enhance the glyphosate tolerance of the crop plant transformed with the DNA molecule; and

b) applying to the crop and weeds in the field a sufficient amount of glyphosate herbicide to control the weeds without significantly affecting the crop.

33. (Amended) [A] The method of claim 32 in which X₁ is D or N; X₂ is S or T; X₃ is S or T; X₄ is V, I or L; and X₅ is P or Q, provided that when X₁ is D, X₂ is T, X₃ is S, and X₄ is V, then X₅ is Q.

35. (Amended) [A] The method of claim 32 in which the structural DNA sequence encodes a fusion polypeptide comprising an amino-terminal chloroplast transit peptide and the EPSPS enzyme.

36. (Amended) [A] The method of claim 35 in which X₁ is D or N; X₂ is S or T; X₃ is S or T; X₄ is V, I or L; and X₅ is P or Q, provided that when X₁ is D, X₂ is T, X₃ is S, and X₄ is V, then X₅ is Q.

38. (Amended) [A] The method of claim [36] 155 in which the DNA molecule encodes an EPSPS enzyme as set forth in SEQ ID NO:3.

39. (Amended) [A] The method of claim [38] 32 in which the DNA molecule further comprises a promoter selected from the group consisting of the CAMV35S and FMV35S promoters.

40. (Amended) [A] The method of claim 39 in which the crop plant is selected from the group consisting of corn, wheat, rice, barley, soybean, cotton, sugarbeet, oilseed rape, canola, flax, sunflower, potato, tobacco, tomato, alfalfa, poplar, pine, [eukalyptus] eucalyptus, apple, lettuce, peas, lentils, grape and turf grasses.

41. (Amended) [A] The DNA molecule of claim 5 in which the structural DNA sequence encodes a chloroplast transit peptide selected from the group consisting of SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15 and SEQ ID NO:17.

42. (Amended) [A] The DNA molecule of claim 41 in which the chloroplast transit peptide is encoded by a DNA sequence selected from the group consisting of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14 and SEQ ID NO:16.

43. (Amended) [A] The DNA molecule of claim 5 in which the structural DNA sequence encodes a chloroplast transit peptide selected from the group consisting of SEQ ID NO:11 and SEQ ID NO:15.

44. (Amended) [A] The DNA molecule of claim 43 in which the chloroplast transit peptide is encoded by a DNA sequence selected from the group consisting of SEQ ID NO:10 and SEQ ID NO:14.

45. (Amended) [A] The DNA molecule of claim 41 in which the promoter is selected from the group consisting of CaMV 35S and FMV 35S promoters.

46. (Amended) [A] The DNA molecule of claim 42 in which the promoter is selected from the group consisting of CaMV 35S and FMV 35S promoters.

47. (Amended) [A] The DNA molecule of claim 43 in which the promoter is selected from the group consisting of CaMV 35S and FMV 35S promoters.

48. (Amended) [A] The DNA molecule of claim 44 in which the promoter is selected from the group consisting of CaMV 35S and FMV 35S promoters.

49. (Amended) [A] The DNA molecule of claim 45 in which the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

50. (Amended) [A] The DNA molecule of claim 46 in which the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

51. (Amended) [A] The DNA molecule of claim 47 in which the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

52. (Amended) [A] The DNA molecule of claim 48 in which the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

57. (Amended) [A] The DNA molecule of claim [53] 137 in which the structural DNA sequence contains an EPSPS encoding sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, and SEQ ID NO:6.

58. (Amended) [A] The DNA molecule of claim [54] 137 in which the structural DNA sequence contains an EPSPS encoding sequence [selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, and SEQ ID NO:6] as set forth in SEQ ID NO. 9.

69. (Amended) [A] The glyphosate-tolerant plant cell of claim [25] 149 in which:

- (a) the promoter is selected from the group consisting of CaMV 35S and FMV 35S promoters;
- (b) the structural DNA sequence encodes:
 - (i) a chloroplast transit peptide selected from the group consisting of SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15 and SEQ ID NO:17; and
 - (ii) an EPSPS enzyme selected from the group consisting of SEQ ID NO:3, SEQ ID NO:5, and SEQ ID NO:7; and

(c) the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

70. (Amended) [A] The glyphosate-tolerant plant cell of claim 69 in which the structural DNA sequence comprises:

(a) a chloroplast transit peptide encoding DNA sequence selected from the group consisting of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14 and SEQ ID NO:16; and

(b) an EPSPS encoding sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, and SEQ ID NO:6.

71. (Amended) [A] The glyphosate-tolerant plant cell of claim 69 in which the structural DNA sequence comprises:

a) a chloroplast transit peptide encoding DNA sequence selected from the group consisting of SEQ ID NO:10 and SEQ ID NO:14; and

b) a DNA sequence encoding an EPSPS enzyme having the sequence of SEQ ID NO:3.

72. (Amended) [A] The glyphosate-tolerant plant cell of claim 71 in which the structural DNA sequence comprises an EPSPS encoding sequence [selected from the group consisting of SEQ ID NO:2 and] as set forth in SEQ ID NO:9.

73. (Amended) [A] The glyphosate-tolerant plant cell of claim 71 selected from the group consisting of corn, wheat, rice, barley, soybean, cotton, sugarbeet, oilseed rape, canola, flax, sunflower, potato, tobacco, tomato, alfalfa, poplar, pine, [eukalyptus] eucalyptus, apple, lettuce, peas, lentils, grape and turf grasses.

74. (Amended) A glyphosate-tolerant plant comprising a DNA molecule of [claims 5, 8 or 10] claim 137 in which:

(a) the promoter is selected from the group consisting of CaMV 35S and FMV 35S promoters;

(b) the structural DNA sequence encodes:

(i) a chloroplast transit peptide selected from the group consisting of SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15 and SEQ ID NO:17; and

(ii) an EPSPS enzyme selected from the group consisting of SEQ ID NO:3, SEQ ID NO:5, and SEQ ID NO:7; and

(c) the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

75. (Amended) [A] The glyphosate-tolerant plant of claim 74 in which the structural DNA sequence comprises:

(a) a chloroplast transit peptide encoding DNA sequence selected from the group consisting of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14 and SEQ ID NO:16; and

(b) an EPSPS encoding sequence selected from the group consisting of SEQ ID NO:2, SEQ ID NO:4, and SEQ ID NO:6.

76. (Amended) [A] The glyphosate-tolerant plant of claim 75 in which the structural DNA sequence comprises:

a) a chloroplast transit peptide encoding DNA sequence selected from the group consisting of SEQ ID NO:10 and SEQ ID NO:14; and

b) a DNA sequence encoding an EPSPS enzyme having the sequence of SEQ ID NO:3.

77. (Amended) [A] The glyphosate-tolerant plant of claim [76] 74 in which the structural DNA sequence comprises an EPSPS encoding sequence [selected from the group consisting of SEQ ID NO:2 and] as set forth in SEQ ID NO:9.

78. (Amended) [A] The glyphosate-tolerant plant of claim [77] 74 selected from the group consisting of corn, wheat, rice, barley, soybean, cotton, sugarbeet, oilseed rape, canola, flax, sunflower, potato, tobacco, tomato, alfalfa, poplar, pine, [eukalyptus] eucalyptus, apple, lettuce, peas, lentils, grape and turf grasses.

79. (Amended) A seed of [a] the glyphosate-tolerant plant of claim 28, wherein the seed comprises the DNA molecule of claim 4, 5 or 8.

80. (Amended) A seed of [a] the glyphosate-tolerant plant of claim 31, wherein the seed comprises the DNA molecule of claim 4, 5 or 8.

81. (Amended) A seed of [a] the glyphosate-tolerant plant of claim 75, wherein the seed comprises the structural DNA sequence of claim 75.

82. (Amended) A seed of [a] the glyphosate-tolerant plant of claim 76, wherein the seed comprises the structural DNA sequence of claim 76.

83. (Amended) A seed of [a] the glyphosate-tolerant plant of claim 77, wherein the seed comprises the structural DNA sequence of claim 77.

84. (Amended) A seed of [a] the glyphosate-tolerant plant of claim 135, wherein the seed comprises the DNA molecule of claim 107.

85. (Amended) A seed of [a] the glyphosate-tolerant plant of claim 150, wherein the seed comprises the DNA molecule of claim 137.

88. (Amended) [A] The DNA molecule of claim 6 in which the structural DNA sequence [encodes] contains an EPSPS [enzyme] encoding sequence selected from the group consisting of SEQ ID NO:41 and SEQ ID NO:43.

89. (Amended) [A] The DNA molecule of claim 8 in which the structural DNA sequence [encodes] contains an EPSPS [enzyme] encoding sequence selected from the group consisting of SEQ ID NO:41 and SEQ ID NO:43.

90. (Amended) [A] The method of claim 16 in which the structural DNA sequence [encodes] contains an EPSPS [enzyme] encoding sequence selected from the group consisting of SEQ ID NO:41 and SEQ ID NO:43.

91. (Amended) [A] The method of claim 19 in which the structural DNA sequence encodes an EPSPS enzyme selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:44.

92. (Amended) [A] The method of claim 33 in which the structural DNA sequence encodes an EPSPS enzyme selected from the sequences as set forth in SEQ ID NO:42 and SEQ ID NO:44.

93. (Amended) [A] The method of claim 36 in which the structural DNA sequence [encodes] contains an EPSPS [enzyme] encoding sequence selected from the group consisting of SEQ ID NO:41 and SEQ ID NO:43.

94. (Amended) [A] The DNA molecule of claim 49 in which the structural DNA sequence encodes an EPSPS enzyme selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:44.

95. (Amended) [A] The DNA molecule of claim 50 in which the structural DNA sequence encodes an EPSPS enzyme selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:44.

96. (Amended) [A] The DNA molecule of claim 51 in which the structural DNA sequence encodes an EPSPS enzyme selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:44.

97. (Amended) [A] The DNA molecule of claim 52 in which the structural DNA sequence encodes an EPSPS enzyme selected from the group consisting of SEQ ID NO:42 and SEQ ID NO:44.

102. (Amended) [A] The glyphosate-tolerant plant cell of claim 25 in which:

- a) the promoter is selected from the group consisting of CaMV 35S and FMV 35S promoters;
- b) the structural DNA sequence encodes:
 - i) a chloroplast transit peptide selected from the group consisting of SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15 and SEQ ID

NO:17; and

ii) an EPSPS enzyme selected from the group consisting of SEQ ID

NO:42 and SEQ ID NO:44; and

c) the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

103. (Amended) [A] The glyphosate-tolerant plant cell of claim [69] 26 in which the structural DNA sequence comprises:

a) a chloroplast transit peptide encoding DNA sequence selected from the group consisting of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14 and SEQ ID NO:16; and

b) an EPSPS encoding sequence selected from the group consisting of SEQ ID NO:41 and SEQ ID NO:43.

104. (Amended) A glyphosate-tolerant plant comprising [a] the DNA molecule of [claims] claim 4, 5[,] or 8 [or 10] in which:

a) the promoter is selected from the group consisting of CaMV 35S and FMV 35S promoters;

b) the structural DNA sequence encodes:

(i) a chloroplast transit peptide selected from the group consisting of SEQ ID NO:11, SEQ ID NO:13, SEQ ID NO:15 and SEQ ID

NO:17; and

(ii) an EPSPS enzyme selected from the group consisting of SEQ ID

NO:42 and SEQ ID NO:44; and

(c) the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

105. (Amended) [A] The glyphosate-tolerant plant of claim [74] 28 in which the structural DNA sequence comprises:

a) a chloroplast transit peptide encoding DNA sequence selected from the group consisting of SEQ ID NO:10, SEQ ID NO:12, SEQ ID NO:14 and SEQ ID NO:16; and

b) an EPSPS encoding sequence selected from the group consisting of SEQ ID NO:41 and SEQ ID NO:43.

107. (Amended) A recombinant, double-stranded DNA molecule comprising in sequence:

a) a promoter [that] which functions in plant cells to cause the production of an RNA sequence;

b) a structural DNA sequence that causes the production of an RNA sequence [that comprises the sequence encoding] which encodes an EPSPS enzyme [comprising] having the sequence of SEQ ID NO:70; and

c) a 3' non-translated region that functions in plant cells to cause the addition of a stretch of polyadenyl nucleotides to the 3' end of the RNA sequence;

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the encoded EPSPS enzyme to enhance the glyphosate tolerance of a plant cell transformed with the DNA molecule.

113. (Amended) A method of producing a genetically transformed [plants that are] plant which is tolerant toward glyphosate herbicide, comprising the steps of:

- a) inserting into the genome of a plant cell a recombinant, double-stranded DNA molecule comprising:
 - i) a promoter that functions in plant cells to cause the production of an RNA sequence;
 - ii) a structural DNA sequence that causes the production of an RNA sequence [that comprises the sequence encoding] which encodes an EPSPS enzyme [comprising] having the sequence of SEQ ID NO. 70; and
 - iii) a 3' non-translated DNA sequence [that] which functions in plant cells to cause the addition of a stretch of polyadenyl nucleotides to the 3' end of the RNA sequence;

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the polypeptide to enhance the glyphosate tolerance of a plant cell transformed with the DNA molecule;

- b) obtaining a transformed plant cell; and
- c) regenerating from the transformed plant cell a genetically transformed plant [that] which has increased tolerance to glyphosate herbicide.

134. (New) A glyphosate tolerant plant cell comprising a DNA molecule of claim 107.

135. (New) A plant comprising a glyphosate tolerant plant cell of claim 134.

136. (New) A method for selectively controlling weeds in a field containing a crop having planted crop seeds or plants comprising the steps of:

a) planting the crop seeds or plants which are glyphosate-tolerant as a result of a recombinant double-stranded DNA molecule being inserted into the crop seed or plant, the DNA molecule having:

i) a promoter which functions in plant cells to cause the production of an RNA sequence,

ii) a structural DNA sequence that causes the production of an RNA sequence which encodes an EPSPS enzyme having the sequence of SEQ ID NO:70; and

iii) a 3' non-translated DNA sequence which functions in plant cells to cause the addition of a stretch of polyadenyl nucleotides to the 3' end of the RNA sequence,

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the EPSPS enzyme to enhance the glyphosate tolerance of the crop plant transformed with the DNA molecule; and

b) applying to the crop and weeds in the field a sufficient amount of glyphosate herbicide to control the weeds without significantly affecting the crop.

137. (New) A recombinant, double-stranded DNA molecule comprising in sequence:

a) a promoter which functions in plant cells to cause the production of an RNA sequence;

b) a structural DNA sequence that causes the production of an RNA sequence which encodes an EPSPS enzyme having the sequence of SEQ ID NO:3, SEQ ID NO. 5 or SEQ ID NO. 7;

c) a 3' non-translated region which functions in plant cells to cause the addition of a stretch of polyadenyl nucleotides to the 3' end of the RNA sequence;

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the encoded EPSPS enzyme to enhance the glyphosate tolerance of a plant cell transformed with the DNA molecule.

138. (New) A DNA molecule of claim 137 in which the structural DNA sequence encodes a fusion polypeptide comprising an amino-terminal chloroplast transit peptide and the EPSPS enzyme.

139. (New) The DNA molecule of claim 137 in which the promoter is a plant DNA virus promoter.

140. (New) The DNA molecule of claim 139 in which the promoter is selected from the group consisting of CaMV35S and FMV35S promoters.

141. (New) The DNA molecule of claim 137 in which the structural DNA sequence encodes a chloroplast transit peptide selected from the group consisting of SEQ ID NO:11 and SEQ ID NO:15.

142. (New) The DNA molecule of claim 137 in which the 3' non-translated region is selected from the group consisting of the NOS 3' and the E9 3' non-translated regions.

143. (New) A method of producing genetically transformed plants which are tolerant toward glyphosate herbicide, comprising the steps of:

a) inserting into the genome of a plant cell a recombinant, double-stranded DNA molecule comprising:

i) a promoter which functions in plant cells to cause the production of an RNA sequence,

ii) a structural DNA sequence that causes the production of an RNA sequence which encodes an EPSPS enzyme having the sequence of SEQ ID NO:3, SEQ ID NO:5 or SEQ ID NO:7; and

iii) a 3' non-translated DNA sequence which functions in plant cells to cause the addition of a stretch of polyadenyl nucleotides to the 3' end of the RNA sequence;

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the polypeptide to enhance the glyphosate tolerance of a plant cell transformed with the DNA molecule;

- b) obtaining a transformed plant cell; and
- c) regenerating from the transformed plant cell a genetically transformed plant which has increased tolerance to glyphosate herbicide.

144. (New) The method of claim 143 in which the structural DNA sequence encodes a fusion polypeptide comprising an amino-terminal chloroplast transit peptide and the EPSPS enzyme.

145. (New) The method of claim 143, wherein the chloroplast transit peptide has the sequence of SEQ ID NO:11 or SEQ ID NO:15.

146. (New) The method of claim 143 in which the promoter is a plant DNA virus.

147. (New) A method of claim 146 in which the promoter is a CaMV35S promoter or a FMV35S promoter.

148. (New) The method of claim 143, wherein the 3' non-translated DNA sequence is a NOS 3' or an e9 3' non-translated sequence.

149. (New) A glyphosate-tolerant plant cell comprising a DNA molecule of claim 137.

150. (New) A plant comprising a glyphosate-tolerant plant cell of claim 149.

151. (New) A glyphosate-tolerant plant cell comprising an EPSPS enzyme having the sequence of SEQ ID NO:3, SEQ ID NO:5 or SEQ ID NO:7.

152. (New) A plant comprising an EPSPS enzyme having the sequence of SEQ ID NO:3, SEQ ID NO:5 or SEQ ID NO:7.

153. (New) A glyphosate-tolerant plant cell of claim 149 or 151 selected from the group consisting of corn, wheat, rice, barley, soybean, cotton, sugarbeet, oilseed rape, canola, flax, sunflower, potato, tobacco, tomato, alfalfa, poplar, pine, eucalyptus, apple, lettuce, peas, lentils, grape and turf grasses.

154. (New) A glyphosate-tolerant plant of claim 150 or 152 selected from the group consisting of corn, wheat, rice, barley, soybean, cotton, sugarbeet, oilseed rape, canola, flax, sunflower, potato, tobacco, tomato, alfalfa, poplar, pine, eucalyptus, apple, lettuce, peas, lentils, grape and turf grasses.

155. (New) A method for selectively controlling weeds in a field containing a crop having planted crop seeds or plants comprising the steps of:

a) planting the crop seeds or plants which are glyphosate-tolerant as a result of a recombinant double-stranded DNA molecule being inserted into the crop seed or plant, the DNA molecule having:

- i) a promoter which functions in plant cells to cause the production of an RNA sequence,
- ii) a structural DNA sequence that causes the production of an RNA sequence which encodes an EPSPS enzyme having the sequence of SEQ ID NO:3, SEQ ID NO:5, or SEQ ID NO:7; and
- iii) a 3' non-translated DNA sequence which functions in plant cells to cause the addition of a stretch of polyadenyl nucleotides to the 3' end of the RNA sequence,

where the promoter is heterologous with respect to the structural DNA sequence and adapted to cause sufficient expression of the EPSPS enzyme to enhance the glyphosate tolerance of the crop plant transformed with the DNA molecule; and

- b) applying to the crop and weeds in the field a sufficient amount of glyphosate herbicide to control the weeds without significantly affecting the crop.